MAY 1981
Number 81-8

statistical reporter

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Prepared Monthly by the Office of Federal Statistical Policy and Standards

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On Estimating Population and Income for Local Areas

By Evelyn M. Kitagawa and Bruce D. Spencer

University of Chicago and Northwestern University

There is great demand for information on the size and socioeconomic characteristics of local areas in years following a census. The Bureau of the Census currently produces postcensal estimates of total population and per capita income for some 39,000 governmental jurisdictions (States, counties, townships and municipalities). An evaluation of its postcensal estimation program is the subject of a recent report of the Panel on Small-Area Estimates of Population and Income, which was organized by the Committee on National Statistics of the National Academy of Sciences at the request of the Bureau of the Census and the Office of Revenue Sharing. This article summarizes a few highlights of the report that are likely to be of wide, nontechnical interest.[1] The authors served as Chairman and Study Director, respectively, for the panel.

Although the Census Bureau has prepared estimates of population for counties and large cities since the 1940's, the techniques for producing estimates for small, local areas were in the early developmental stages when general revenue sharing legislation (the State and Local Fiscal Assistance Act) was enacted in 1972. The act required that the most recently available data on population and per capita income (PCI) provided by the Census Bureau be used to determine the allocation of general revenue sharing (GRS) funds among approximately 39,000 eligible units of local government. This requirement prompted the Census Bureau to undertake the major task of making estimates of population and PCI for the 39,000 jurisdictions, which include approximately 3,000 counties and 36,000 subcounty areas. A large majority of the subcounty areas have very small populations. In 1975, for example, 85 percent had less than 5,000 population; 54 percent had less than 1,000 population; and over one-third had less than 500 population. The Bureau's estimates are used in a variety of activities, including the allocation of Federal and state funds, public and private planning and decision-making, determining the eligibility of a locality for self-government, and scholarly research. The importance of the estimates in determining the allocations made under Federal grant programs has been stressed both in the professional literature and in the courts. More than 100 programs make allocations partly or solely on the basis of population estimates. A recent study (Emery *et al.* 1980) shows that Federal allocation programs used the postcensal estimates to distribute over $50 billion in fiscal year 1979.

In evaluating the Census Bureau's estimation program, the panel was specifically requested to review methods and data sources currently used and possible alternate methods and sources, and to assess the levels of accuracy of the estimates in light of the uses made of them and of the effects of potential errors on these uses.

The panel's assessment of the accuracy of the estimates was based primarily on comparisons with the results of special censuses carried out during the 1970's. Since special censuses are usually conducted at the request and expense of the local governments involved, and this self-selection may result in a biased assessment of overall accuracy, a more conclusive evaluation awaits comparison of the estimates with the results of the 1980 decennial census.

Although the postcensal estimation program produces estimates of total population and per capita income for approximately 39,000 areas, the

[1]Copies of the report, *Estimating Population and Income of Small Areas*, are available at $13.75 per copy from National Academy Press, 2101 Constitution Avenue, N.W., Washington, D.C. 20418. The 247-page report contains the complete set of the panel's recommendations and discussion of their implications, an evaluation of the accuracy of the estimates, and extensive description and comments on the estimation methods.

estimation methodology is designed to measure the *change* in total population and per capita income of each area since the last national census enumeration. The estimates of change for each area are then applied to its population and per capita income as determined in the last census. Thus, the implicit objective of the methodology is the estimation of postcensal change in population and PCI, and the panel evaluated the estimates from this perspective as well as in terms of the accuracy of the estimated total population and PCI.

The panel did not address the question of whether or not the population estimates should be adjusted for census undercount for two reasons. First, this question is equivalent to asking whether or not reported census figures should be adjusted for census undercount (since census data and postcensal estimates should be consistent in this respect), a question recently considered by another panel of the Committee on National Statistics (National Research Council, 1978). Second, if a decision were made to adjust the population estimates for census undercount, essentially the same estimation methodology currently used by the Census Bureau could be used to estimate postcensal change; the major difference in procedure would be that the reported data from the last census would be adjusted for census undercount before being added to the estimates of postcensal change.

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Findings and Recommendations

The panel found that the methodology of the population estimation procedures used by the Census Bureau is generally sound. The Bureau was also commended for attempting to measure the error of its estimates and publishing the results (See Bureau of the Census, 1980). Despite the basic soundness of the methodology, however, it produces estimates of population that are directionally biased for some categories of areas. Moreover, estimates for certain categories of areas are subject to large random errors.

In general, the population estimates for counties were quite accurate. The average percent difference[2] between estimates of total population and special census counts was 3.9 percent for 133 counties in which special censuses were taken from 1974 through 1976. By size of county, the average error ranged from only 1.4 percent for counties with 100,000 or more population to 7.1 percent for those with less than 1,000 population. (Average percent differences may be interpreted as estimates of levels of error.)

Among subcounty areas the range of error was much wider. The 1975 population estimates, for example, were quite accurate for subcounty areas with large populations but were highly inaccurate for areas which were very small or had experienced rapid rates of growth or decline since 1970. Specifically, the average percent difference between 1975 estimates and comparable 1975 special census counts was only 2.6 percent for areas with 25,000 or more population in 1970, as compared with an average error of 23 percent for

[2]Average percent difference refers to the average of the difference between the postcensal estimate of total population and the special census count, expressed as a percent of the special census count.

areas with 500 to 999 population, and an average error of 23 percent for areas with less than 500 population. The accuracy of the 1975 estimates also varied greatly by the rate of change in population between 1970 and 1975. Subcounty areas with less than 5 percent growth or decline had an average error of 6 percent, as compared with average errors of 23 percent or more for areas which grew by at least 50 percent or declined by at least 10 percent. There also was evidence of bias in the estimates, which tended to underestimate the amount of change in population since the last census; that is, the population of growing areas was consistently underestimated, while the population of declining areas was consistently overestimated. For example, the 1975 population was underestimated for 78 percent of the areas that grew by 25 to 49 percent between 1970 and 1975, and for 91 percent of the areas that grew by 50 percent or more. On the other hand, the 1975 population was overestimated for 84 percent of the areas that declined by at least 10 percent between 1970 and 1975.

In order to assess the impact of errors on the uses made of the estimates, the panel did not rely solely on the estimates of percent error just cited. For two reasons, it was felt that error should also be evaluated relative to the change in population of an area since the last census. First, this seemed to be an appropriate measure of the accuracy of the estimation methodology because, as mentioned earlier, the methods used are designed to estimate change in population since the last census; the estimated change is then applied to the previously enumerated census count in order to estimate the total population of an area. Second, the adequacy of the population estimates for updating proportional allocations of funds in the years following a census (as in GRS, for example) depends on the accuracy of the estimated changes in population since the last census.

The panel's analysis of the percent error in estimated changes in population had two results worth noting. First, the pattern of error was reversed—that is, subcounty areas subject to little or no growth had the largest errors relative to change in population, whereas the fast-growing areas had much smaller errors. Second, the errors in estimated change were excessively large for areas with small populations. For example, the average error in the 1975 estimates for 118 subcounty areas which had 1,000 to 2,500 population in 1970 was 111 percent of the change in population between 1970 and 1975, as compared with an error of only 10 percent in the estimate of total population for the same areas. Moreover, in 20 of the 118 areas the estimated change in population was in the wrong direction. In the panel's judgement, estimates subject to errors of this magnitude are not adequate for purposes of updating GRS allocations of funds (the use which originally prompted the Census Bureau to expand its estimation program to cover the 39,000 GRS jurisdictions).

The panel's first recommendation, therefore, was that the Census Bureau should continue to make population estimates for counties and for cities above a certain size, but that it discontinue its population estimates for subcounty areas that are too small to be estimated with reasonable accuracy. Although more evaluation is needed before a precise determination can be made of how small is too small, it seems clear that a population of 500 is too small. Based on the available data, the panel suggested that a population of 5,000 or 10,000 might be a reasonable threshold, but a final determination should await a comparison of postcensal estimates for 1980 with the 1980 census counts. (Only 15 percent of the subcounty areas for which estimates are made had a population of 5,000 or more in 1975; but those areas contained 83 percent of the total population of the subcounty areas.)

The task of estimating postcensal per capita income is even more formidable than that of estimating population. The limited evaluation data available indicated that the subcounty PCI estimates were less accurate than the population estimates. No evaluation data were available for county PCI estimates, but the panel was suspicious of their accuracy, especially for those counties for which farm income is a significant component of total income.

Estimation of income is especially difficult because of the complexity of the concept of income as well as the lack of good data. Different measures of income can be constructed depending on the concept adopted. The Census Bureau's concept of per capita income is defined in terms of the mean or average *total money income* of residents in a given area. Data on money income are readily obtained from censuses or household surveys. However, they are difficult to obtain from

administrative records, which form the data base from which the estimates of postcensal changes in per capita income are developed. In updating PCI, the Census Bureau relies basically on data from IRS income tax returns to estimate the wage and salary component of total money income, but must rely on BEA (Bureau of Economic Analysis) estimates in order to estimate the other components of money income. However, the conceptual basis for the BEA income estimates is that of *personal income* in the national income accounts, which includes in-kind payments and imputed items as well as income received by quasi-individuals such as nonprofit institutions and private trust funds. Since the concepts of total money income and personal income are not congruent, converting BEA personal income estimates into estimates of components of total money income requires difficult adjustments of unknown reliability.

The panel's second recommendation was that the Census Bureau not continue to make postcensal estimates of PCI below the county level and that it give serious consideration to discontinuing estimates for counties as well. The panel did not have any suggestions for improving the methodology for PCI estimates, nor did it know of alternative data sources that might produce substantially more accurate estimates at moderate cost.

The panel's report includes six additional recommendations of a more technical nature, including a proposal for a full statistical evaluation of the population estimates and several proposals for technical modifications of the population estimation procedures which might improve the accuracy of the estimates to some degree, especially for counties and large cities. However, the panel could think of no feasible procedure within the limits of present data sources that would significantly reduce the errors in population estimates for small sub-county areas. Accurate estimates for small areas do not appear possible unless data collection is increased enormously.

In the panel's view, the Census Bureau is in an unnecessarily difficult situation. It is required to defend (almost to the last digit) estimates of total population that its own analyses have shown may have relative errors of 25 percent or more. Legislation that authorizes distribution of funds on the basis of population or income estimates for local areas gives increased incentive for officials from these areas to challenge the Bureau's figures, and an increasing share of the Bureau's energies must be devoted to these challenges and the public relations problems they generate.

Discussion

The panel's recommendations have important implications for general revenue sharing and other programs that use the postcensal estimates of population and PCI to update the allocation of funds in years following a census. For GRS—as structured in the 1972 State and Local Fiscal Assistance Act—if postcensal estimates are not available for all subcounty jurisdictions in a State, they cannot be used at all.[3] This rule implies that if the panel's recommendations are adopted, then the distribution of subcounty proportional shares of GRS funds must either remain frozen between censuses or be updated solely on the basis of other factors in the allocation formulas for which local data are available.

The consequences of these alternatives are not obvious. Allocations of funds are targeted on problems. The GRS formula, for example, was designed to "put the money where the needs are." Although the statistical variables in the GRS formulas represent some measure of the needs, they are but proxies for the variables legislators have in mind. Furthermore, it is not clear how frequently variables should be updated to achieve the objectives of the legislation. It is possible that frequent updates might even work against the intent of the legislation. As the House Select Committee on Population noted (U.S. Congress, 1978, p. 7):

> Formulas for the distribution of Federal aid typically include a population-size factor. Therefore, if an area loses some of its inhabitants, it is likely to lose funds when it most needs Federal assistance—during the transition to a smaller tax base and changed needs for social services.

The views expressed thus far reflect the consensus of the panel as a whole, although no indi-

[3]GRS allocations are determined in a hierarchical manner; State allocations are determined first, then each State's allocation is divided among county areas and the State government, and then each county area allocation is divided among its subcounty areas and the county government.

vidual member should or would want to be held responsible for every point made in the panel's report. The remainder of this discussion concerns some issues not discussed in the report.

It is worth noting that the GRS legislation was recently extended through 1982. Presumably, 1980 census counts will be used until that time (because of the time lag in preparing postcensal estimates); however, it should be possible to change the specifications for allocation formulas in subsequent legislation. The provisions of the 1972 act pressured the Census Bureau to prepare estimates for 39,000 local areas, more than one-third of which had less than 500 population. The expectation that satisfactory estimates could be made for so many small areas was unrealistic, in our view.[4]

We are concerned about the mushrooming of legislation that authorizes distribution of funds on the basis of estimates of population and characteristics of small local areas. It would seem reasonable to request legislators to consult with Census Bureau officials and other experts before legislation is drafted, in order that specifications for allocation can be based on what is feasible. For example, specifications could be written to take advantage of postcensal estimates for large subcounty areas, for which accurate estimates can be made, without requiring that estimates be available for all subcounty areas.

Another issue involves the recent demise of the 1985 mid-decade census. The panel was instructed to develop its recommendations in light of the anticipated 5-year schedule for future censuses. This consideration was an important assumption underlying the panel's deliberations, because it makes a difference whether estimates span a 5-year or 10-year period when one attempts to assess the effects of potential errors on uses of the estimates. For example, the level of error of postcensal estimates probably increases with elapsed time since the last census. Also, the need for postcensal estimates depends on the number of years between censuses. With quinquennial censuses, allocation of funds could be updated every 5 years without resort to postcensal estimates. With decennial censuses, updates based on census counts would be available only every 10 years.

The demise of the 1985 census has been attributed to the conviction—in the Administration and the Congress—that a mid-decade census designed to provide data on population and socioeconomic characteristics for small local areas could not be carried out at a significantly lower cost than the one billion dollars spent for the 1980 census, and to the hopeful belief that the need for small area estimates of population and PCI for the GRS program could be adequately met through modest improvements that have been proposed in the intercensal demographic estimates program. The panel's findings do not support this belief. In our judgment, accurate estimates of population and PCI cannot be developed unless data collection is increased enormously, for example, by the use of large-scale sample surveys or more frequent censuses.

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[4]In a hearing before the Ways and Means Committee in 1972, when the GRS Act was being drafted, Census Bureau officials stated that the methodology for producing estimates for small areas was not yet developed and tested, and could be very inaccurate for places with less than 50,000 population (U.S. Congress, 1972).

CURRENT DEVELOPMENTS

SCHEDULE FOR UPDATING GENERAL-PURPOSE STATISTICAL INDEX NUMBERS TO THE 1977 BASE YEAR

The reference base period for Federal Government General Purpose Statistical Index Numbers is updated approximately once every 10 years. This is done to (a) insure that the makeup of the index is based on a reasonable approximation of the current structure of the economy, and (b) facilitate the visual comprehension of rates of change from a base period that is not too distant in time.

The new base period of 1977=100 was adopted last year (see March 4, 1980 *Federal Register* and March 1980 *Statistical Reporter*). The previous reference period was 1967=100. The year 1977 was chosen for two reasons: (1) the most recent quinquennial economic censuses were taken for 1977 and many economic time series are benchmarked to the economic censuses, and (2) the continued expansion of the economy in 1977 following the 1974-75 recession was relatively balanced with no particularly extreme conditions that would make it unrepresentative of the recent period.

The purpose of this note is to give data users advance notice of the conversion of individual data series to the new base period so they can plan for the changeover. The schedule of past and approximate future release dates for the broader index number series in statistical agencies is shown below. A limited number of series have already been converted to the 1977 base, although the conversion for most series is planned for later this year and in 1982.

Announcements of the updating a few months in advance of publication will also appear in agency periodicals and statistical releases. Further information can be obtained from the source agencies directly.

SCHEDULE FOR CONVERTING FEDERAL INDEX NUMBERS TO THE 1977 BASE YEAR

Statistical Series	Release Date: Actual or Planned
Bureau of Labor Statistics, Department of Labor	
Employment data: establishment	
Aggregate weekly hour indexes	July 1981
Aggregate weekly payroll indexes	July 1981
Average weekly earnings indexes	July 1981
Federal Government hours and earnings indexes	July 1981
Gross and spendable earnings indexes	February 1982
Price data	
Consumer price indexes	February 1982
Import and export price indexes	February 1982
Producer price indexes	February 1982
Productivity data	
Economy-wide productivity and related output, cost, price and profit indexes	January 1981
Productivity for the Federal Government	June 1981
Productivity for selected industries	June 1981
Productivity for United States and 11 industrialized countries	May 1981
Wage data	
Area wage survey indexes	January 1981
Hourly earnings index	July 1981
Salary trend indexes	Fall-Winter 1981-82
Union wage rate indexes: building trades	January 1981
Union wage rate indexes: other industries	July 1981
Bureau of the Census, Department of Commerce	
Price index of new one-family houses sold	April 1981
Value of new construction put in place (constant dollars)[1]	July 1981
Expenditures for additions and alterations to residential properties (constant dollars)[1]	June 1981

Statistical Series	Release Date: Actual or Planned
Unit value indexes of U.S. foreign trade by principal end-use category	May 1981
Indexes of production (1977 Census of Manufactures)	December 1981
Money income distributions of families and persons from 1947 to 1979 (constant dollars)[1]	December 1981
Federal Reserve Board	
Industrial production index	April 1982
Industrial capacity index	April 1982
Bureau of Economic Analysis, Department of Commerce	
Gross national product deflators and price indexes[2]	1985
Business cycle indicators	Spring 1982
Economics and Statistics Service, Department of Agriculture	
Output and productivity data	
Cash receipts from farm marketings	July-August 1981
Physical volumes of farm marketings	July-August 1981
Monthly crop production index	August 1981
Farm productivity and related output, cropland, labor, and input indexes	Fall 1982
Price data	
Index of prices received by farmers	Summer 1981
Index of prices paid by farmers	Summer 1981
Index of farm wage rates	Summer 1981
Market basket statistics	January 1982
Real estate and transportation data	
Index of farm real estate values	July 1981
Index of taxes levied on farm real estate	December 1981
Rail freight index for selected agricultural commodities	December 1981

(NORMAN FRUMKIN, OFFICE OF FEDERAL STATISTICAL POLICY AND STANDARDS, DEPARTMENT OF COMMERCE, telephone (202) 673-7977)

[1]Although these series in constant dollars are not index numbers, they are included here because they will be converted to 1977 constant dollars to be consistent with the new index number base period.

[2]The GNP deflators on a 1977 base will be developed as part of the next benchmark revision of the national economic accounts. The recent benchmark revision published in December 1980 was on a 1972 base.

PRODUCTIVITY MEASURES FOR SELECTED INDUSTRIES, 1954-79

The Bureau of Labor Statistics has released *Productivity Measures for Selected Industries, 1954-79*, Bulletin 2093.

This edition contains measures for six industries previously not covered: paper and plastic bags, fabricated structural metal, construction machinery, drug and proprietary stores, ball and roller bearings, and bus carriers. Also included for the first time are components of previously published measures for the electric utility and gas utility industries. This bulletin updates indexes of output per employee hour and output per employee for the industries previously included in the U.S. Government's industry productivity measurement program, along with related measures of output, employment, and employee hours.

The 206-page report may be purchased for $6.50 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, GPO bookstores, or from any BLS regional office. A limited number of single copies are available free from the Office of Productivity and Technology, Bureau of Labor Statistics, Washington, D.C. 20212. (CHARLES W. ARDOLINI, DIVISION OF INDUSTRY PRODUCTIVITY STUDIES, BUREAU OF LABOR STATISTICS, DEPARTMENT OF LABOR, telephone (202) 523-9244)

HISTORY OF THE 1977 ECONOMIC CENSUSES

The Bureau of the Census recently released the *History of the 1977 Economic Censuses*, a comprehensive report on the procedures and subject matter of the 1977 economic censuses. This history describes the latest quinquennial census of the Nation's economic activity, from the early stages of planning to the data collection, data processing, and publication of the final reports.

TRENDS IN COLLEGE DEGREES AWARDED TO WOMEN

A picture of the progress achieved by women in obtaining college degrees is presented by the

National Center for Education Statistics (NCES) in a report entitled *Degree Awards to Women: 1979 Update*.

This report is based on data collected between 1971 and 1979 in NCES's Higher Education General Information Survey (HEGIS). Separate chapters are devoted to bachelor's, master's, doctoral, and first-professional degrees. Each chapter consists of: (a) an overview, (b) an examination by field of study of the percentage representation of women among degree recipients in 1979 as compared with 1971, and (c) an examination of the relative popularity of different fields of study for men and for women, and how this changed during the 9-year period.

Among the highlights of the report are:

- At all four degree levels, women continued to increase, at least slightly, their percentage representation among degree recipients.
- In 1979 women accounted for 48.3 percent of the bachelor's degrees, 49.1 per cent of the master's degrees, 28.1 percent of the doctoral degrees, and 23.6 percent of the first-professional degrees.
- At the bachelor's degree level, women now predominate in two fields which have not traditionally been regarded as women's fields. These are psychology (61.3 percent) and public affairs and services (53.5 percent).
- At both the bachelor's and master's degree levels, but not at the doctoral level, women showed their greatest increases in percentage representation in those fields where they have traditionally been least represented.
- In 1979 women still accounted for less than one-third of the bachelor's degrees awarded in the fields of: agriculture and natural resources (27 percent), architecture and environmental design (26 percent), business and management (31 percent), computer and information sciences (28 percent), engineering (8 percent), military science (3 percent), physical sciences (23 percent), and theology (26 percent).

Single copies of the report may be obtained from the Statistical Information Office, National Center for Education Statistics (Presidential Building, Room 205), 400 Maryland Avenue, S.W., Washington, D.C. 20202, telephone (301) 436-7900.

Additional information on the report may be obtained from the author, George H. Brown, at the same address. (O. JEAN BRANDES, NATIONAL CENTER FOR EDUCATION STATISTICS, DEPARTMENT OF EDUCATION, telephone (301) 436-7873)

NONMETRO YOUTH IN THE LABOR FORCE

The Economics and Statistics Service in the Department of Agriculture recently published a report entitled *Nonmetro Youth in the Labor Force*.

This report provides an empirical basis for comparing the labor force status of youth in metro and nonmetro areas. The report also highlights the differences in labor market conditions faced by youth who are enrolled in school and those who are not. Data from the March 1976 Current Population Survey, the most current data for which all the variables are available on a metro, nonmetro basis, were utilized in this study.

Youth employment problems, often portrayed as purely metro-related, are just as pronounced in nonmetro areas. Such factors as high unemployment levels, highly seasonal swings in labor force participation, and the concentration of employment opportunities in low-skilled occupations are characteristics of each. This report includes these findings:

1. Unemployment of youth (16-24 years of age) was 11.7 percent for both metro and nonmetro areas in 1979. This represented over 2 million unemployed metro youth and 880,000 nonmetro youth.
2. The 1979 labor force participation rate of nonmetro youth was about 68 percent, while the metro rate was slightly over 69 percent.
3. The 1976 labor force participation rate for youth enrolled in school was about 31 percent in nonmetro areas and 35 percent in metro areas. In both, this was less than one-half the rate of nonenrolled youth.
4. Students experienced significantly higher unemployment than metro and nonmetro non-students. The 1976 unemployment rate for metro and nonmetro students was 22 percent and 17 percent, respectively.
5. Metro and nonmetro minority students experienced exceptionally low rates of labor force participation in 1976, less than 20 percent, and extremely high unemployment

rates, 34 percent in nonmetro areas and 43 percent in metro areas.

6. Youth employment was concentrated in clerical and service occupations and accounted for 46 percent of metro youth and 36 percent of nonmetro youth in 1976.
7. The wholesale and retail trade and the service industries employed over 80 percent of nonmetro students and over 86 percent of metro students in 1976.

Single free copies of the 16-page report (Rural Development Research Report number 27) are available in Room 450, GHI Building, 500 12th St., S.W., Washington, D.C. 20250 (SIGURD R. NILSEN, ECONOMICS AND STATISTICS SERVICE, DEPARTMENT OF AGRICULTURE, telephone (202) 447-8086)

MULTIPLE FRAME DESIGN TO ESTIMATE ECONOMIC DISTRIBUTIONAL EFFECTS

The Economics and Statistics Service in the Department of Agriculture recently published a report entitled *A Multiple Frame Design to Estimate Economic Distributional Effects.*

This report describes a survey to study the economic distributional effects of household and establishment subpopulations in a rural area of Kentucky. This multiple frame survey was conducted in 1979. It relied on two independent frames—a list frame of establishments (private and public inclusive) and an area frame of households and establishments. Both frame sources were stratified. The list was stratified by firm function (nine standard industrial classes) and substratified into three sizes: 1-19 employees, 20-99 employees, and 100 or more employees. The area frame was stratified into three geographical areas—urban, suburban, and rural. Sampled list establishments provided a subsample of their employees for enumeration. The list firms and their sampled workers formed the overlap domain of the population. Sampled households and firms in the area frame not represented on the list formed the nonoverlap domain of the population. This determination was necessary under the assumptions of multiple frame sampling and occurred during the screening process. Data collection was confined in the area frame to sampling units in the nonoverlap (NOL) domain because of time and monetary constraints.

Three questionnaires were used to gather data—a household version, a private establishment questionnaire, and a government version. Field work extended over a 3–month period with data collection divided into three stages.

All subpopulation estimates of means and totals were constructed at the strata level. Domain estimates of totals were made for each subpopulation group. The independent domain estimates were then combined into composite total estimates for each subpopulation. A combined ratio estimator was used to compute household mean estimates.

This estimation technique proved to be a feasible approach and is recommended for future use in surveys of households and establishment traits.

Single free copies of the 14–page report (ESS Staff Report No. AGESS801126) are available in Room 0133 South Building, U.S. Department of Agriculture, Washington, D.C. 20250 (DOUGLAS G. KLEWENO, ECONOMICS AND STATISTICS SERVICE, DEPARTMENT OF AGRICULTURE, telephone (202) 447-7545)

1980 STATISTICAL ABSTRACT—AMERICA'S STATISTICAL SNAPSHOT

The 1980 edition of the *Statistical Abstract of the United States* has been released by the Bureau of the Census. This 101st issue presents over 1,600 tables and 70 charts on a wide variety of subjects and serves as a convenient statistical reference and a guide to other statistical publications and sources.

Almost 100 new tables have been introduced this year. Some focus specifically on people, their interests and concerns—unmarried couples, persons with elevated blood pressure, health aid use, characteristics of jail inmates, pesticide residues in human tissue, Head Start Program enrollment and appropriations, and day care center enrollment.

Others deal with government and economic activities, showing the finances of public school systems, Federal credit activities, dependency of State and local governments on outside aid, and Department of Defense purchases. The Abstract also has a new supplement to the energy section.

Highlighted are data specifically related to residential energy consumption.

Other valuable features include the results of the 1980 election and the 1977 economic censuses shown in various tables throughout the *Abstract.*

The Statistical Abstract of the United States, 1980 may be purchased in either a clothbound edition ($13; GPO Stock No. 003-024-02681-3) or a paperbound edition ($10, GPO Stock No. 003-024-02680-5) from GPO. A discount of 25 percent is allowed on orders of 100 or more copies sent to the same address. (GLEN W. KING, BUREAU OF THE CENSUS, DEPARTMENT OF COMMERCE, telephone (301) 449-1650)

RECENT NSF REPORTS

The National Science Foundation (NSF) has recently released a new report, *Scientists, Engineers, and Technicians in Private Industry, 1978-80* (NSF 80-320). This report presents the findings of employment studies based on data from surveys conducted by the Bureau of Labor Statistics for NSF. It summarizes 1980 employment patterns and recent and expected trends in the industrial and occupational distribution of scientists, engineers, and technicians. The report explores implications for future demands for scientific and technical personnel in various occupations. Results are limited to the manufacturing sector and largely to nonregulated industries in the nonmanufacturing sector (i.e., they exclude wholesale and retail trade, transportation, communications, and public utilities). Copies of the report (NSF 80-320) are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 for $2.00 per copy. Request stock number 038-000-00472-7.

Also issued were two *Science Resources Studies Highlights.* The first, "Federal Academic Science Support Rose by 13% in FY 1979" (NSF 81-303), summarizes data collected from the 14 Federal agencies with the largest programs in support of academic science. Funding by these agencies represented over 99 percent of all Federal academic R&D obligations and about 95 percent of all Federal obligations to universities and colleges for all programs in fiscal year 1979. The data are given for total Federal support by type of activity and for the 100 institutions receiving the largest amounts. Under academic activities, data are shown for research and development, R&D plant, and other science activities.

The second, "R&D Expenditures Increased 3% in Real Terms at Universities and Colleges in FY 1979" (NSF 81-304) reports on the findings of NSF's Survey of Scientific and Engineering Expenditures at Universities and Colleges, FY 1979. The survey was mailed to 567 universities and colleges including all institutions that grant a graduate degree in the sciences or engineering, as well as to academic institutions with $50,000 or more in separately budgeted R&D expenditures. R&D expenditures are shown by source, field of science, character of work, and institutional control. Also included is a list of the 20 institutions reporting the largest R&D expenditures.

These *Highlights* are available from the Division of Science Resources, National Science Foundation, 1800 G Street, N.W., Washington, D.C. 20550. (CHARLES E. FALK, DIVISION OF SCIENCE RESOURCES STUDIES, NATIONAL SCIENCE FOUNDATION, telephone (202) 634-4622)

1981 CONFERENCE OF THE NATIONAL COMPUTER GRAPHICS ASSOCIATION

The National Computer Graphics Association, Inc. (NCGA) will hold its second annual conference and exposition in the Baltimore Convention Center, Baltimore, Maryland, June 14-18, 1981. NCGA is a nonprofit association dedicated to promoting and improving computer graphics applications in business, government, science, and the arts.

There will be 54 paper sessions, 18 tutorials, and over 100 exhibitors. Selected topics to be covered include:

- CAD/CAM
- Computer graphics in medicine, education, and chemistry
- Business graphics
- Space science applications
- Statistical graphics
- Computer graphics in local governments
- Military applications
- Hardware
- Transportation
- Overview of computer graphics

For further information on speakers, papers to be presented, company exhibits, and additional topics to be covered, as well as registration fees, contact:

National Computer Graphics Association
2033 M Street, N.W. Suite 330
Washington, D.C. 20036
Telephone (202) 466-5895

INTERNATIONAL CONFERENCE ON THE IMPACT OF COMPUTERIZATION ON SOCIAL RESEARCH

There will be an international conference on "The Impact of Computerization on Social Research: Data Bases and Technological Development," to be held in Grenoble, France, September 14-18, 1981 at the Université des Sciences Sociales. This conference has been organized by:

— International Federation of Data Organizations (IFDO)
— International Association for Social Science Information Service and Technology (IASSIST)
— Centre National de Recherches Scientifiques (CNRS)
— Laboratoire d'Informatique pour les Sciences de L'Homme (LISH)
— University of Grenoble

Conference themes include: new types of research, new institutions, new tools, relations between data producers and users, and social science teaching. One day of the conference will be devoted to three concurrent workshops on the following topics: (1) the assay/evaluation of survey, ecological, satellite, and cartographic data; (2) the organization and management of data services; and (3) the formation of a professional data archivist and librarian. French and English will be the working languages of the conference.

Persons wishing to prepare a paper should send an abstract of the paper and personal resume by June 1, 1981 to: Mr. Frédéric Bon, C.E.R.A.T., Institut d'Etudes Politiques, B.P. 34, 38401 St. Martin d'Hère, France.

IASSIST has received from the National Science Foundation a small group travel award to assist U.S. scientists to participate in this conference. Approximately 12 U.S. scientists will be provided with the equivalent of one-half the cost of an APEX high season air fare between one of three points of departure (Los Angeles, Chicago, or New York) and Paris, France. The use of a U.S. air carrier is required.

The travel award will be nationally competed. The Selection Committee will strive for a good balance between young and experienced scientists and practitioners; among those contributing papers, organizing and presenting workshop sessions, and invited speakers; and a good geographic and institutional (private, not-for-profit sector) distribution.

Any interested U.S. scientists should send a 500-word abstract of a paper he/she intends to present and curriculum vitae (7 copies of each) to:

Dr. Joseph W. Duncan, Chair
IASSIST Selection Committee
c/o Dr. Richard Rockwell
Social Science Research Council
1755 Massachusetts Avenue, N.W.
Washington, D.C. 20036

The application must be received no later than June 28, 1981. A decision will be made by July 25, 1981.

For further information on the conference or the competition for travel support, please contact Alice Robbin, President, IASSIST c/o Data and Program Library Service, 4452 Social Science Building, University of Wisconsin, Madison, Wisconsin 53706, telephone (608) 262-7962.

UN YEARBOOK OF WORLD ENERGY STATISTICS, 1979

The United Nations Statistical Office recently released the *Yearbook of World Energy Statistics, 1979* (formerly *World Energy Supplies*). This is the twenty-third in an annual internationally comparable series on energy, summarizing world energy trends. It updates and enlarges upon the statistical series shown in previous volumes on a consistent and internally comparable time series, which is drawn from a computer-processed data file. The *Yearbook* covers the principal elements of production, import, export, bunkers, stock change and apparent consumption of solid fuels, petro-

leum and its secondary energy and nonenergy refined products, natural gas liquids, natural and manufactured gases and electricity (differentiated by thermal, hydro, geothermal and nuclear) for 195 countries and areas. The comparison between different fuels is presented in metric tons of coal equivalent as well as in metric tons of oil equivalent and in terajoules for the world, regions and countries. Separate data on end-of-year capacity figures for industrial and public electric generating plants and crude petroleum refineries, as well as production of enriched uranium, and production and trade of fuelwood and charcoal, are also shown. In addition, four tables in matrix form present international trade flows in hard coal, crude petroleum, natural gas and electricity between principal exporting and importing countries and regions.

New tables disaggregate previously published series, introduce index numbers and reflect all transactions as a percentage of total consumption for individual commodity groupings. Tables providing data for the first time on energy resources, distillation capacity of natural gas liquids plants and the development status of hydroelectric powersites are also included. In addition, there are series dealing with the value of international trade of fuels, energy prices for selected countries, annual and quarterly unit value and quantum indices as well as the value of the imports of mineral fuels of individual countries with developed market economies. The addition of these tables is a further step towards completing the quantitative picture and assessment of the energy raw materials situation.

For the convenience of users of the publication and as a guide to further detailed information, a 22-page compendium of national, regional and global sources of energy statistics is included.

The *Yearbook* is the only international publication providing data on all forms of commercial energy for all the countries and areas of the world; this global overview is particularly timely, since energy problems and policies are at the forefront of current international debate.

Copies of the *Yearbook of World Energy Statistics, 1979* (Statistical Papers, Series J, No. 23, liv + 1209 pp., UN Sales No. E/F.80.XVII.7, cloth-bound $60.00) may be purchased from the Sales Section, United Nations, New York, New York 10017. When ordering, please use the price and stock number. Government agencies should request the discount to which they are entitled, as it is not automatically given.

PERSONNEL NOTES

BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM

Division of Research and Statistics: EDWARD MCKELVEY, formerly Chief of the Wages, Prices and Productivity Section, has been transferred to the position of Chief of the Capital Markets Section to replace DONALD KOHN who has been promoted to Deputy Associate Director. JOYCE ZICKER, formerly Senior Economist in the Wages, Prices and Productivity Section, has been promoted to Chief of the Section.

Deceased

DEPARTMENT OF LABOR

Bureau of Labor Statistics: BARBARA A. BOYES, Assistant Commissioner for Survey Design, died March 20, 1981. As the highest ranking mathematical statistician in the Bureau, she was responsible for the statistical quality of the Bureau's programs.

SCHEDULE OF RELEASE DATES FOR PRINCIPAL FEDERAL ECONOMIC INDICATORS

June 1981

Release dates scheduled by agencies responsible for the principal economic indicators of the Federal Government are given below. *These are target dates* that will be met in the majority of cases. *Occasionally agencies may be able to release dates a day or so earlier or may be forced by unavoidable compilation problems to release a report one or more days later.* In certain cases,* timing variability in the receipt of raw data requires a range of dates rather than a specific release date.

A similar schedule will be shown here each month covering release dates for the following month. The indicators are identified by the title of the releases in which they are included; the source agency; and the release identification number where applicable. Release date information for additional series can be found in publications of the sponsoring agencies.

(Any inquiries about these series should be directed to the issuing agency.)

Date		*Subject*	*Data for*
June	1	Construction Expenditures (Press release), Census, C-30	April
	2	Selected Interest Rates, Federal Reserve Board (FRB), G.13	May
	2	Sales, Inventories of Single-Family Homes, Census, C-25	April
	2	Manufacturers' Shipments, Inventories, and Orders, Census, M3-1	April
	*4-5	Consumer Installment Credit, FRB, G.19	April
	5	The Employment Situation (Press release), Bureau of Labor Statistics (BLS)	May
	5	Producer Price Indexes (Press release), BLS	May
	5	Monthly Wholesale Trade (Press release), Census, BW	April
	5	Factors Affecting Bank Reserves and Condition Statement of Federal Reserve Banks, FRB, H.4.1	Week Ending June 3
	5	Weekly Consolidated Condition Report of Large Commercial Banks and Domestic Subsidiaries, FRB, H.4.2	Week Ending May 27
	5	Money Stock Measures, FRB, H.6	Week Ending May 27
	8	Manufacturers' Export Sales and Orders, Census, M4-A	April
	9	Monthly Selected Services Receipts (Press release), Census	April
	10	Plant and Equipment Expenditures, Bureau of Economic Analysis (BEA)	1Q'81
	10	Crop Production, Agriculture	June 1

Date		Subject	Data for
June	11	Supply/Demand Estimates, Agriculture	Current Marketing Season
	11	Advance Monthly Retail Sales (Press release), Census (54)	May
	12	Factors Affecting Bank Reserves and Condition Statement of Federal Reserve Banks, FRB, H.4.1.	Week Ending June 10
	12	Weekly Consolidated Condition Report of Large Commercial Banks and Domestic Subsidiaries, FRB, H.4.2	Week Ending June 3
	12	Money Stock Measures, FRB, H.6	Week Ending June 3
	12	Manufacturing and Trade: Inventories and Sales, Census	April
	15	Quarterly Financial Report for Manufacturing, Mining and Trade Corporations, Federal Trade Commission	1Q'81
	15	Yields on FHA Insured New Home 30-year Mortgages, HUD	June 1
	16	Housing Starts (Press release), Census, C-20	May
	16	Industrial Production, FRB, G.12.3	May
	17	Personal Income and Outlays, BEA	May
	17	Capacity Utilization: Manufacturing and Materials, FRB, G.3	May
	18	Gross National Product (Second Revision), BEA	1Q'81
	18	Corporate Profits (Revised), BEA	1Q'81
	18	Summary of U.S. International Transactions, BEA	1Q'81
	19	Factors Affecting Bank Reserves and Condition Statement of Federal Reserve Banks, FRB, H.4.1	Week Ending June 17
	19	Weekly Consolidated Condition Report of Large Commercial Banks and Domestic Subsidiaries, FRB, H.4.2	Week Ending June 10
	19	Money Stock Measures, FRB, H.6	Week Ending June 10
	19	Advance Report on Durable Goods, Manufacturers' Shipments and Orders (Press release), Census, M3-1	May
	19	Manufacturing Capacity Utilization, BEA	March
	22	Hogs and Pigs, Agriculture	June 1
	23	Consumer Price Index (Press release), BLS	May
	23	Real Earnings (Press release), BLS	May
	23	Supply/Demand Estimates, Agriculture	Current Marketing Season

Date		Subject	Data for
June	23	Treasury Statement (the monthly "budget"), Treasury	May
	26	Factors Affecting Bank Reserves and Condition Statement of Federal Reserve Banks, FRB, H.4.1	Week Ending June 24
	26	Weekly Consolidated Condition Report of Large Commercial Banks and Domestic Subsidiaries, FRB, H.4.2	Week Ending June 17
	26	Money Stock Measures, FRB, H.6	Week Ending June 17
	26	Export and Import Merchandise Trade (Press release), Census, FT-900	May
	29	Sales, Inventories of Single-Family Homes, Census, C-25	May
	*26-30	Savings and Loan Association Activity (Press release), Federal Home Loan Bank Board	May
	30	Manufacturers' Shipments, Inventories, and Orders, Census, M3-1	May
	30	Labor Turnover in Manufacturing (Press release), BLS	May
	30	Work Stoppages (Press release), BLS	May
	30	Agricultural Prices, Agriculture	Mid-June
	30	Composite Indexes of Leading, Coincident, and Lagging Indicators (Press release), BEA	May

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